Raiganj Surendranath Mahavidyalaya

CBCS B.Sc PHYSICS Honours (PRACTICAL Exam)

Semester-3, 2021

DC 5P: MATHEMATICAL   PHYSICS-II

Full Marks-15   **Time- 2 Hours**

Answer any THREE questions: (3×5)

1. Using Numpy create a 3×3 identity matrix in Python. Write the code and the output.

2. i) Show that $\int_{3}^{5} \sqrt{\dfrac{5-x}{x-3}}\ dx = \ \prod.$

   ii) Reshape an one dimentional numpy array of integers between 1 to 9 in 3×3 array. Write the code and the output.

3. Show that $\int_{0}^{pi/2} dx \dfrac{\sqrt{\tan(x)}}{(\cos(x)+\sin(x))^2}\ = \prod/2$

4. i.) Show that for x > 0 , $\Gamma (x + 1) = x\,\Gamma (x)$.

ii) Express the integral $\int_{0}^{\infty} \exp(-p^s)\,dp,\,s>0$ in terms of Gamma functions.

5. i) Write down the definitions of the Gamma function $\Gamma (x)$, for Re (x) > 0.

   ii) Prove the integral by a suitable substitution $\int_{0}^{1} \left|\ln(x)^{-1/2}\right| dx = \sqrt{pi}$